Duck Creek Bridge
Spanning Yellowstone River
on MT Route 329
Billings Vicinity
Yellowstone County
Montana

HAER No. MT-60



PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Rocky Mountain Regional Office
Department of the Interior
P.O. Box 25287
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HISTORIC AMERICAN ENGINEERING RECORD

DUCK CREEK BRIDGE

## I. INTRODUCTION

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| Location: | The Duck Creek Bridge is located in the E1/2 of the NE1/4 of Section 4, Township 2 South, Range 25 East. The bridge carries Montana Secondary Route 329 over the Yellowstone River. The bridge is approximately six miles southwest of Billings, Montana and seven miles east of Laurel, Montana. |
| Quad: | Mossmain |
| UTM: | Zone 12, E - 683740, N - 5062500 |
| Date of Construction: | 1915 |
| Present Owner: | Yellowstone County, Montana<br>Yellowstone County Courthouse<br>Billings, Montana |
| Present Use: | Vehicular bridge for a gravel county road |
| Significance: | The Duck Creek Bridge is significant for its associations with the homestead boom in Montana. The bridge is an important representative example in Montana of the riveted Warren through truss. The bridge is also significant for its association with the Security Bridge Company, Billings, Montana, the most prolific of Montana's early 20th century bridge-building companies. |
| Historian: | Lon Johnson, Renewable Technologies, Inc., Butte, Montana, October 1989 |

## II. HISTORY

Census statistics for Montana reveal the rush for land that ran its course from 1900 to 1918. The population of the state stood at 243,329 in 1900, rose to 376,053 in 1910, and reached 548,889 in 1920. By the latter date, the state had already experienced two years of drought and the great exodus had begun, ending the homesteading boom. The number of farms in the state during the period 1900-1920 increased from 13,370 to 57,677.[1] A number of circumstances coincided with extensive promotional campaigns by the railroads to create this unprecedented rush for land. Passage of the Enlarged Homestead Act of 1909, increased the size of homesteads available from 160 to 320 acres. The development of new farming implements made it easier to operate the larger farms. Dry land farming techniques were developed and actively promoted in areas previously thought to require irrigation. Greater than average annual precipitation fell for much of the first two decades of the century. The prices for farm products climbed steadily.[2]

### A. HISTORY OF THE DUCK CREEK AREA

In 1909, the Northern Pacific Railroad became the last of Montana's transcontinental railroads to begin a major promotional effort to attract settlers to lands along its lines in Montana. Yellowstone County in south-central Montana was especially attractive to the early arrivals.[3] The fertile Yellowstone River valley runs through the middle of the county and the

Northern Pacific Railroad provided convenient transportation. The dryland farming area south of the Yellowstone River between the Clark Fork of the Yellowstone River and Billings had been part of the Crow Indian Reservation until pressure from white settlers was successful in having the area opened to settlement in the 1890s.[4]

By 1910, a majority of the land had been filed on by homesteaders and the demand for public infrastructure had begun. Bridges were especially important because the ceded strip was on the south side of the Yellowstone River while Laurel, Billings, and the Northern Pacific tracks were on the north side, making access to markets difficult. Homesteaders south of the river had to ford it or travel great distances out of their way to cross at a bridge. When a bridge was built across the Clark Fork of the Yellowstone in 1912 with public subscriptions by settlers and businessmen, access from the south side to Laurel was improved. By 1914, a school had been built at Duck Creek and consideration was being given to dividing the Duck Creek School District to accommodate the growing population. Subscriptions were also being made to provide for construction of a community hall for the area.[5]

B. CONSTRUCTION OF THE DUCK CREEK BRIDGE

Yellowstone County voters in the 1914 November election approved the sale of $77,000 in bonds for the construction of two bridges across the Yellowstone River, one at Pompey's Pillar and one at Duck Creek. In February, 1915, the commissioners accepted plans and specifications for the bridges prepared by

R.M. Murray of Billings. The next month, the Commissioners received bids for the two bridges from eighteen bridge building companies, each company submitting bids on seven different bridge plans. The contract for the two bridges was awarded to the Security Bridge Company of Billings, Montana which submitted the low bids of $43,920 for the Pompey's Pillar Bridge and $31,950 for the Duck Creek Bridge. The Central States Bridge Company of Indianapolis, Indiana, supplied the Security Bridge Company with steel structural members for the Duck Creek Bridge.[6]

Prior to 1901, the only bridges across the lower Yellowstone River were located at Billings and Glendive. With the onset of the early 20th century settlement boom, several major Yellowstone Bridges were built, beginning with the 1902 pin-connected Pennsylvania through truss structure at Fort Keogh near Miles City. Each of the subsequent Yellowstone River Bridges was also a pin-connected structure until 1915 when the riveted Pompey's Pillar and Duck Creek Bridges were built. They were the last Yellowstone River bridges built before the creation of the Bridge Bureau of the State Highway Commission (SHC), which developed standardized plans for use throughout the state. The standard SHC through truss was a riveted Warren truss very similar to the Pompey's Pillar and Duck Creek Bridges.[7]

C. R.M. MURRAY

Little is known of Ray M. Murray. While designing the Pompey's Pillar and Duck Creek Bridges, he was employed on an annual contract by the

Yellowstone County Commissioners with compensation set at three percent of the contracts he supervised. He practiced as a civil engineer and consulting engineer in Billings from about 1913 to about 1922. His earliest association was with a firm called the Montana Bridge Structural Company, about which little more is known. The company bid on some bridge construction projects, but no surviving bridges have been identified with it. During his tenure in Billings, Murray did not join the Montana Society of Engineers or other professional groups. Another of his major projects was the design of the water treatment plant at Hardin, a town about 40 miles east of Billings.[8]

D. SECURITY BRIDGE COMPANY

The Security Bridge Company was the most prolific bridge building company in Montana during the early 20th century, especially in central and eastern Montana. The Montana Historic Bridge Inventory identified 32 bridges built by the company. William S. Hewett and his cousin, Arthur L. Hewett, founded the company in 1906. William began his career in 1887 with the Minneapolis-based bridge building company of his uncle, Seth M. Hewett. Ten years later, he formed his own company, the William S. Hewett Bridge Company in Minneapolis. This company built numerous bridges in Minnesota, the Dakotas, and Montana. Arthur began his bridge-building career with Seth, but went to work as a travelling agent for his cousin in 1898. In 1906, William and Arthur Hewett formed the Security Bridge Company in Minneapolis. They had opened a Billings office in 1904, and in 1910, Arthur moved to Billings. The following year, Security Bridge Company moved its headquarters to Billings and filed articles

of incorporation with the State of Montana, listing William S. Hewett as president. By 1913, Arthur was president of the company and William, while maintaining his financial interest in the company, turned his mind toward other interests, such as the development of prestressed municipal water tanks. The Security Bridge Company ceased business in 1926.[9]

E. CENTRAL STATES BRIDGE COMPANY

Origins of the Central States Bridge Company date to 1895, when Eugene Runyan and others organized the New Castle Steel Sewer Pipe Company at New Castle, Indiana. In 1897, to mirror the primary market for the products they were fabricating, Runyan's corporation changed its name to the New Castle Bridge Company. The firm expanded quickly with large contracts in Iowa, Virginia, and Michigan. Around 1900, the company moved its headquarters to Indianapolis where it continued to grow. The company again changed its name in 1905 to the Central States Bridge Company. Prior to World War I, the company did a substantial bridge business in ten states, from Oklahoma to Wisconsin, and across the northern tier of states from Minnesota to Washington. Montana's 1981 statewide bridge inventory identified four bridges constructed by the Central States Bridge Company. Bridge contractors in Montana, like the Security Bridge Company undoubtedly purchased bridge steel from Central States for many other construction projects.[10]

## III. DESCRIPTION OF THE DUCK CREEK BRIDGE

The Duck Creek Bridge is comprised of three 152-foot riveted Warren through truss spans with polygonal upper chords. A 39-foot steel plate girder approach span is located at each end. Concrete abutments and four concrete piers support the structure.

The inclined end posts and the upper chords are composed of two 8-inch channel sections riveted with a continuous steel cover plate along the upper flanges and with 14-inch long by 1/4-inch thick lacing bars riveted along the lower flanges. Vertical members at the panel intersections are comprised of two pairs of 4-inch by 3-inch angle sections riveted with lacing bars. The remaining verticals (at the mid-panels) are built up of two 3-inch by 2-1/2-inch angle sections riveted together with batten plates. The diagonal struts in the hip panels are two 4-inch by 3-inch angle sections riveted with lacing bars. The outer-most, full-length diagonals are two pairs of 3-inch by 2-1/2-inch angle sections riveted with lacing bars. The remaining diagonals are two 8-inch channel sections riveted with lacing bars at each flange. The lower chords consist of two pairs of 3-1/2-inch by 2-1/2-inch angle sections riveted with lacing bars at the hip panels and two pairs of 5-inch by 3-inch angles sections riveted with lacing bars in the remaining the panels.

Primary sway bracing consists of single angle-section lattice between two pairs of angle sections riveted to the vertical members at the panel

intersections. Secondary sway bracing consists of laced struts riveted to the upper chords at mid-panel (where the diagonals meet). Top lateral bracing is provided by crossed angle sections.

The 18-inch steel I-beam floor beams are riveted to the verticals above the lower chords. The 12-inch steel stringers rest atop the floor beams and support a wood plank deck. Bottom lateral bracing is provided by crossed angle sections.

The original latticed guardrails, extending the entire length of the bridge, are still in-place.

## IV. FUTURE OF THE BRIDGE

The Duck Creek Bridge is owned by Yellowstone County, Montana. The Montana Department of Highways and Yellowstone County are planning to re-align the gravel road which connects the two sides of the Yellowstone River. These plans call for the replacement of the Duck Creek Bridge. In accordance with Section 106 of the National Historic Preservation Act of 1966, the Federal Highway Administration and the Montana Department of Highways have executed a Memorandum of Agreement with the Montana Historical Society and the Advisory Council on Historic Preservation under which this Historic American Engineering Record documentation is taking place. The bridge was offered for relocation with no response.

V. ENDNOTES

1. Michael P. Malone and Richard B. Roeder, Montana: A History of Two Centuries (Seattle: University of Washington Press, 1978), 148.

2. Fredric L. Quivik, Historic Bridges in Montana (Washington, D.C.: Historic American Engineering Record, 1982), 30-31; Mary Wilma M. Hargreaves, Dry Farming in the Northern Great Plains: 1900-1925 (Cambridge, Harvard University Press, 1957), 16-17.

3. Hargreaves, 230.

4. Historical Research Associates, "Montana Indian Reservations Historical Jurisdiction Study," [1981], Missoula, Montana, 45-47.

5. "Farming Country South of Laurel," Laurel (Montana) Outlook, 16 December 1915, 9.

6. Yellowstone County "Commissioners Proceedings," Book 7, 9 November 1914, 621; Book 8, 20 February 1915, 64; 20 March 1915, 93; Central States Bridge Company, "Duck Creek Bridge, Yellowstone County, Montana," shop drawings dated 25 May 1915 on file at the Surveyor's Office, Yellowstone County Courthouse, Billings, Montana.

7. Quivik, Historic Bridges in Montana, 55, 75.

8. Yellowstone County "Commissioners Proceedings," Book 8, 29 December 1914, 29. The Montana Bridge and Structural Company bid on construction of the Voges Ranch Bridge in Sweetgrass County in 1914, but did not receive the contract, Sweetgrass County Commissioners minutes for the meeting of 7 April 1914, Office of the Clerk and Recorder, Sweetgrass County Courthouse, Big Timber, Montana; Murray is listed in the 1913-1914, 1916, 1917, 1918, 1919 Polk's Billings City Directories and the 1922 Northwest Publishing Company's Directory of Billings, all available in the Billings Public Library; Murray is not found in any of the standard bibliographical sources for Montana. According to lists in the Journal of the Society of Montana Engineers, he was not a member of the Society, to which many of Montana's prominent civil engineers belonged.

9. Quivik, "Montana's Minneapolis Bridge Builders," IA: Journal of the Society for Industrial Archeology 10 (1984): 45.

10. James L. Cooper, Iron Monuments to Distant Posterity: Indiana's Metal Bridges, 1870-1930 (Greencastle, Indiana: DePauw University, 1987), 24-25; Quivik, Historic Bridges in Montana, 40.

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### C. ARTICLES AND PAPERS

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Quivik, Fredric L. "Montana's Minneapolis Bridge Builders." IA: The Journal of the Society for Industrial Archeology 10 (1984): 41-46.

### D. GOVERNMENT RECORDS

Central States Bridge Co. "Duck Creek Bridge, Yellowstone County, Montana." Shop drawings. 25 May 1915. Surveyor's Office, Yellowstone County Courthouse, Billings, Montana.

Sweetgrass County "Commissioners Minutes." Sweetgrass County Courthouse, Big Timber, Montana. 7 April 1914.

Yellowstone County "Commisssioners Proceedings." Yellowstone County Courthouse, Billings, Montana. 9 November 1914; 29 December 1914; 20 February 1915; 20 March 1915.